

REMARKSStatus of the claims:

With the above amendment, claim 47 has been amended. Claims 1-50 are pending with claims 39-41 and claims 48-50 having been withdrawn from a prior election of species requirement. Thus, claims 1-38 and 42-47 are ready for further action on the merits. No new matter has been added by way of the above amendment. The dependency of claim 47 has been changed. Reconsideration is respectfully requested in light of the following remarks.

Improper Finality

Applicants submit that the finality of the Office Action of January 7, 2003 is in error because of the rejection of claims 1 and 5 over Peker '642 in view of Kobayashi '501 and further in view of Sieleman '005. Neither claim 1 nor 5 was amended in the response of August 12, 2002. The Examiner did not previously cite either Kobayashi '501 or Sieleman '005 and the rejection was not necessitated by amendment (nor are the claims new). Thus, Applicants submit that the finality of the Office Action is improper and respectfully request that the finality be withdrawn should the instant response not lead to a Notice of Allowability.

Restriction/Election of Species

Applicants respectfully request that the election of species requirement be withdrawn as it is believed that it would not be an undue burden on the Examiner to search all the claims.

Drawings

The Examiner has objected to the drawings for not showing all of the features of the claimed invention. Applicants submit that a drawing is not necessary to understand the claimed invention. Accordingly, no further drawings are included with the instant Reply.

Double Patenting

The Examiner has objected to claim 47 as being a substantial duplicate of claim 45. Applicants have amended claim 47 so that it is now dependent from claim 21. Applicants believe that with this amendment that the objection has been obviated. Withdrawal of the objection is respectfully requested.

Rejections under 35 U.S.C. § 103

Claims 21, 23-25, and 30 remain rejected under 35 U.S.C. § 103(a) as being unpatentable over Peker '642 (US Patent No. 5,896,642).

Claims 1-20, 22, 26-29 and 31-32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Peker '642 in view of Kobayashi '742 (US Patent No. 5,611,742).

Claims 42-43 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Peker '642 in view of Kobayashi '742 and further in view of Anderson '663 (US Patent No. 5,261,663).

Claim 44 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Peker '642 in view of Anderson '663.

Claims 1, 5, and 45-47 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Peker '642 in view of Kobayashi '501 (US Patent No. 5,601,501) and further in view of Sieleman '005 (US Patent No. 5,792,005).

These rejections are traversed for the following reasons.

Present Invention

The present invention as recited in claim 1 relates to a golf club head comprising a hitting face for golf balls. The hitting face is formed at least partially by a metallic material, with the metallic material satisfying the following relation:

$$y \geq 0.006x + 60.$$

In the above formula,

x is Young's modulus in units of kgf/mm², and

y is tensile strength in units of kgf/mm². The metallic material has a young's modulus of 3,000 to 12,000 kgf/mm², and a tensile strength of 105 to 175 kgf/mm². The hitting face has at least partially a hitting portion, which consists of the above-mentioned metallic material with a thickness of 1 to 3 mm.

Disclosure of Peker '642

Peker '642 discloses a metallic article that is fabricated by providing a die and a piece of a bulk-solidifying amorphous metallic alloy having a glass transition temperature. The bulk-solidifying amorphous metallic alloy is heated to a forming temperature of from about 0.75 T_g to about 1.2 T_g and forced into the die cavity at the forming temperature under an external pressure of from about 260 to about 40,000 pounds per square inch, thereby deforming the piece of the bulk-solidifying amorphous metallic alloy to a formed shape that fills the die cavity. Peker '642 discloses preferred embodiments wherein the pressure is applied to the piece of the bulk-solidifying amorphous metallic alloy as it is heated, and the heating rate is at least about 0.1°C/s.

Peker '642 fails to disclose a Young's modulus (x) and a tensile strength (y) that satisfies the following equation: $y \geq 0.006x + 60$. Peker '642 also fails to disclose a Young's modulus that is in the range of 3,000 to 12,000 kgf/mm², and a

tensile strength in the range of 105 to 175 kgf/mm². Peker '642 also fails to disclose a hitting face that has at least partially a hitting portion, which consists of a metallic material with a thickness of from 1 to 3 mm.

Disclosure of Kobayashi '742

Kobayashi '742 discloses a wood-type golf club head having plural cavities formed in the back surface of a head body. The back surface of the metallic head body is formed with plural cavities, opposite to the face of the head body. The cavities are formed by forging, thus generating even and fine metallic tissues and grain flow. Accordingly, the toughness and durability of the material can be enhanced, so that the face can be made thinner to 1.0 to 3.5 mm thickness for realizing an optional weight distribution. As a result, a larger sweet area can be realized without damaging the strength of the head.

Kobayashi '742 fails to disclose a Young's modulus (x) and a tensile strength (y) that satisfies the following equation: $y \geq 0.006x + 60$. Kobayashi '742 also fails to disclose a Young's modulus that is in the range of 3,000 to 12,000 kgf/mm² with a tensile strength that is in the range of 105 to 175 kgf/mm².

Disclosure of Anderson '663

Anderson '663 discloses a golf club head that has a main body portion formed by an investment casting of material such as stainless steel, beryllium copper, titanium, and aluminum. The face plate of the head is formed of a forged metal, such as forged carbon steel, with the plate being welded to the face portion of the casting to form an integral assembly therewith. The forged metal face plate is said to afford a more solid impact and feel to the club which provides better control. Also, the club is said to have very high strength. In the invention of Anderson '663, the head preferably consists of cast stainless steel, and the face plate of forged stainless steel, both steels being of the same composition. The face plate metal is preferably re-distributed toward the toe and heel of the head.

Anderson '663 fails to disclose a Young's modulus (x) and a tensile strength (y) that satisfies the following equation: $y \geq 0.006x + 60$.

Disclosure of Sieleman '005

Sieleman '005 discloses an iron golf club head including a front surface, or striking surface, and a rear surface. The striking surface and the rear surface are demarcated by an upper edge, a heel, a lower edge and a toe. The rear surface has an

open cavity demarcated by a recess and a peripheral edge. The recess of the head according to the invention of Sieleman '005 is a convex surface that extends from the peripheral edge of the cavity.

Sieleman '005 fails to disclose the mechanical properties of the face material that are defined in claims 1, 5, and 21 of the instant invention.

Removal of the Rejections over Peker '642, Kobayashi '742
Anderson '663, Sieleman '005

The Examiner again appears to be relying on inherent properties of the disclosed composition of Peker '642 to arrive at the instant invention. The Examiner says it would have been obvious to modify the face of Peker '642 to have a Young's modulus and tensile strength as disclosed in the instant invention. The Examiner appears to presume that the face of Peker '642 will have substantially the same properties as the claimed invention because the composition of Peker '642 is alleged to have the same composition as the instant invention.

Applicants, however, respectfully point out that, as was shown in Table 2 in the response of January 3, 2002 (that is also attached to the instant reply), the same metal composition as the embodiment of the instant invention was not shown in Peker '642. Moreover, even if the compositions were the same (which Applicants do not concede), there are cases where

mechanical properties, such as a Young's modulus or mechanical strength differ. Because these mechanical properties can differ, these mechanical properties cannot be inherent to the composition.

As an example of how these mechanical properties can differ, a metal with the same composition as another metal shows different mechanical properties by changing the heat treatment conditions in a manufacturing process or the amorphous ratios. The amorphous ratio can be changed by certain parameters such as the cooling temperature for cooling the melting alloy in the production of the amorphous alloy. Alternatively, the amorphous ratio can be adjusted by the oxygen concentration in the atmosphere (see the explanation at page 14, lines 1-14 of the instant written description). Thus, although examples 3 and 4 in the instant invention have similar compositions to the composition disclosed in Peker '642, the Young's modulus and tensile strength differ greatly in intensity because the amorphous ratio is different.

Attached to this reply, Applicants submit two documents providing supporting evidence for how mechanical properties can differ even though compositions are the same. These supporting documents disclose that even when the metals have the same composition, the tensile strength and hardness differ greatly by changing the heat treatment conditions. Please refer to the

partial English translations also submitted with these documents.

Accordingly, the Young's modulus and the hardness of two different metallic alloys can never be presumed to be the same even if the compositions are the same. The Young's modulus and the hardness are dependent upon how the composition was made. In other words, the composition of Peker '642, although similar, cannot be presumed to be the same as the instant invention.

The instant inventors diligently and intensively experimented until they were able to come up with the unexpectedly superior golf club hitting face of the instant invention, that is neither disclosed nor suggested by the disclosure of Peker '642.

Moreover, the titanium golf club face of Kobayashi '501 that has a thickness of 1.0 to 3.5 mm does not make up for the failures in Peker '642. Although the golf club face in Kobayashi '501 is not supported by a support member in the back, the tensile strength of the alloy as shown in Table 1 in Kobayashi '501 is 65 (kgf/mm²) which is outside the scope of instant claims 1 and 21.

Sieleman '005 and Anderson '663 also fail to make up the deficiencies in Peker '642 and Kobayashi '501. The compositions of Sieleman '005 and Anderson '663 do not disclose the

mechanical properties of the face plate of the instant invention that are defined in claims 1, 5 and 21.

For the above reasons, Applicants submit that none of Sieleman '005, Anderson '663, Peker '642 and Kobayashi '501 can render obvious the instant invention, either taken separately or combined. The rejections over these references are inapposite. Withdrawal of the rejections is warranted and respectfully requested.

With the above remarks and amendments, it is believed that the claims, as they now stand, define patentable subject matter such that a passage of the instant invention to allowance is warranted. A Notice to that effect is earnestly solicited.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a one (1) month extension of time for filing a reply in connection with the present application, and the required fee of \$110.00 is attached hereto.

If any questions remain regarding the above matters, please contact Applicant's representative, T. Benjamin Schroeder (Reg. No. 50,990), in the Washington metropolitan area at the phone number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachments

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims have been amended as follows:

47. (Amended) The golf club head of claim [1] 21 wherein the head comprises a head body and a face plate made of said metallic material wherein the face plate is constructed with a thicker central part with a periphery part whose thickness reduces gradually outward.